

### **REMARKS**

This is a full and timely response to the non-final Office Action mailed by the U.S. Patent and Trademark Office on June 27, 2007. Upon entry of the attached amendments, claims 1-31 are pending in the application. Claims 1, 9, 18 and 24 are amended. Support for the amendments to claims 1, 9, 18 and 24 can be found in FIG. 4 and the related detailed description. Consequently, no new matter is added to the present application.

The following remarks address each rejection. Accordingly, reconsideration and allowance of the application and presently pending claims 1-31 are respectfully requested.

#### **Rejections Under 35 U.S.C. § 102**

Claims 1-5, 9, 10, 18 and 19 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 6,396,345 to Dolman *et al.* (hereafter *Dolman*).

A proper rejection of a claim under 35 U.S.C. § 102 requires that a single prior art reference disclose each element of the claim. *See, e.g., W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983). Anticipation requires that each and every element of the claimed invention be disclosed in a single prior art reference. *See, e.g., In re Paulsen*, 30 F.3d 1475, 31 USPQ2d 1671 (Fed. Cir. 1994); *In re Spada*, 911 F.2d 705, 15 USPQ2d 1655 (Fed. Cir. 1990). Alternatively, anticipation requires that each and every element of the claimed invention be embodied in a single prior art device or practice. *See, e.g., Minnesota Min. & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992). The test is the same for a process. Anticipation requires identity of the claimed process and a process of the prior art. The claimed process, including each step thereof, must have been described or embodied, either expressly or inherently, in a single reference. *See, e.g., Glaverbel S.A. v. Northlake Mkt'g & Supp., Inc.*, 45 F.3d 1550, 33 USPQ2d 1496 (Fed. Cir. 1995). Those elements must either be inherent or disclosed expressly. *See, e.g., Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 7 USPQ2d 1057 (Fed. Cir. 1988); *Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 2 USPQ2d 1051 (Fed. Cir. 1987). Those elements must also be arranged as in the claim. *See, e.g., Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913 (Fed. Cir. 1989); *Carella v. Starlight Archery & Pro Line Co.*, 804 F.2d 135, 231 USPQ 644 (Fed. Cir. 1986). For anticipation, there must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. *See, e.g., Scripps Clinic &*

*Scripps Clinic & Res. Found. v. Genentech, Inc.*, 927 F.2d 1565, 18 USPQ2d 1001 (Fed. Cir. 1991).

Accordingly, the single prior art reference must properly disclose, teach or suggest each element of the claimed invention.

The Office Action states that

[r]eferring to claim 1, Dolman teaches a system for generating multiple amplitude matched, phase shifted signals, comprising:

A filter arrangement including a plurality of nodes (see col. 12, lines 38-44), each node configured to provide an associated vector that is offset in phase from a vector associated with each other node (see col. 9, lines 31-44);

An adjustable element associated with each node, the adjustable element configured to substantially equalize an amplitude of each vector associated with each node (see col. 9, lines 11-30).

Claims 9 and 18 are similarly rejected.

*Dolman* discloses a phase and amplitude detector and a method of determining errors, and is particularly, but not exclusively, applicable to the measurement of phase and amplitude errors for compensation purposes in the linearization of power amplifiers. See *Dolman*, col. 1, lines 10-15 According to *Dolman*,

In a preferred embodiment the amplifier circuit further comprises an adaptive pre-distorter coupled to receive the at least one error signal from the detector, the adaptive pre-distorter further coupled to the phase and gain modulators, the adaptive pre-distorter arranged to determine the gain and phase error correction signals with respect to a set of look-up values, thereby to linearise performance of the amplifier.

See *Dolman*, col. 3, lines 37-44.

*Dolman* continues

[p]referably, a slow feedback loop containing a phase/amplitude equalizer having a second amplitude modulator and a second phase modulator coupled to the amplifier, the phase/amplitude equalizer further containing baseband processing elements coupled to the detector and arranged to receive, in use, the at least one error signal as a control signal for the baseband processing elements, whereby the phase/amplitude equalizer is arranged to track out circuit variations arising from at least one of unit-to-unit variations, thermal drift and long-term component drift through amplitude and phase control of, respectively, the second amplitude modulator and the second phase modulator.

See *Dolman*, col. 3, lines 45-55.

*Dolman* then states

The present invention therefore provides an improved phase and amplitude comparator particularly, but not exclusively, useful in an amplifier

linearisation process. In overview, the preferred embodiments of the present invention operate to isolate small error terms from large signal terms and then to cause corrective operation on the small error terms only. In accordance with the preferred embodiments of the present invention, an improved linear power amplifier is beneficially provided in which linearisation is performed by correction to the signal envelope. Indeed, in contrast with prior art systems, the present invention advantageously overcomes two effects exhibited by conventional phase and amplitude comparator techniques, namely an ability to resolve accurately small differences between relatively large signals with high dynamic range and, second, an ability to reduce dynamic range requirements of detectors employed to ease their associated tracking requirements.

See *Dolman*, col. 4, lines 49-65.

From this it is clear that *Dolman* discloses a phase and amplitude comparator that is used to linearized a power amplifier.

In contrast to *Dolman*, Applicants' claim 1 includes at least "an adjustable element associated with each node, the adjustable element configured to *receive a feedback signal and in response to the feedback signal* substantially equalize an amplitude of each vector associated with each node." Applicants respectfully submit that at least this feature is not disclosed, taught or suggested by *Dolman*.

Applicants respectfully disagree with the statement in the Office Action that *Dolman* discloses "[a]n adjustable element associated with each node, the adjustable element configured to substantially equalize an amplitude of each vector associated with each node (see col. 9, lines 11-30)."

Applicants respectfully submit that in column 9, lines 11-30, *Dolman* merely discloses

the construction and generation of vector components 250-256 that are subject to amplitude and phase comparison in accordance with the present invention. From an illustrative perspective, it is assumed that voltage components of carrier vectors (namely reference carrier vector R and feedback carrier vector F) can be represented as voltage vectors. The two carrier vectors R and F are nominally in anti-phase; this eases implementation and does not compromise generality. The reference carrier vector R can be described as having an amplitude R. The feedback carrier vector F can be described as having a wanted component equal to, but in anti-phase with, the reference vector (i.e. -R), with the feedback carrier vector F further having an amplitude error term  $a \cdot (-R)$  and a phase error term  $p \cdot (-R^*)$  orthogonal to the amplitude error term.  $R^*$  is equal in amplitude but orthogonal to R. The vector summation of the reference carrier vector R with the orthogonal error terms  $a \cdot (-R)$  and  $p \cdot (-R^*)$  therefore defines feedback carrier vector F.

Applicant respectfully submit that *Dolman* fails to disclose, teach or suggest an

adjustable element, much less “an adjustable element associated with each node, the adjustable element configured to *receive a feedback signal and in response to the feedback signal* substantially equalize an amplitude of each vector associated with each node,” as recited in claim 1.

Applicants respectfully submit that it appears that the Office Action is equating *Dolman's* system for isolating phase and amplitude errors using a vector manipulation technique that generates a frame of reference vectors, with Applicants' adjustable element that receives a feedback signal to substantially equalize the amplitude of a vector associated with each node. It appears that *Dolman's* frame of reference vectors, shown best in Figure 6b, includes reference vectors of differing magnitudes to determine amplitude error (252) and phase error (254). However, *Dolman* fails to disclose, teach or suggest at least Applicants' “adjustable element associated with each node, the adjustable element configured to *receive a feedback signal and in response to the feedback signal* substantially equalize an amplitude of each vector associated with each node,” as recited in claim 1.

Similarly, independent claim 9 includes at least “*providing a feedback signal to each node*; and adjusting each node *using the feedback signal* to substantially equalize an amplitude of each vector associated with each node.” Applicants respectfully submit that at least this feature is not disclosed, taught or suggested by *Dolman*.

Similarly, independent claim 18 includes at least “*means for providing a feedback signal to each node*; and means for *using the feedback signal to substantially equalize* an amplitude of each vector associated with each node.” Applicants respectfully submit that at least this feature is not disclosed, taught or suggested by *Dolman*.

Element not inherent in *Dolman* and *Dolman* Teaches Away From the Invention

Applicants respectfully submit that an adjustable element associated with each node, the adjustable element configured to receive a feedback signal and in response to the feedback signal substantially equalize an amplitude of each vector associated with each node, is not inherent in *Dolman*. Applicants further respectfully submit that there is nothing in *Dolman* that would suggest to one having ordinary skill in the art to modify *Dolman* to reach the adjustable element associated with each node, the adjustable element configured to receive a feedback signal and in response to the feedback signal substantially equalize an amplitude of each vector associated with each node, of the present invention and instead teaches away from the present

the present invention. Applicants respectfully submit that there is no suggestion or motivation put forth in *Dolman* that would lead one having ordinary skill in the art to provide an adjustable element associated with each node, the adjustable element configured to receive a feedback signal and in response to the feedback signal substantially equalize an amplitude of each vector associated with each node. Nor is such an adjustable element inherent in *Dolman*. Indeed, *Dolman* shows a frame of reference vectors that differ in magnitude. (See *Dolman*, Figure 6b). Further, Applicants have reviewed *Dolman* and can find no reference to an adjustable element associated with each node, the adjustable element configured to receive a feedback signal and in response to the feedback signal substantially equalize an amplitude of each vector associated with each node.

Specifically, none of the benefits of the adjustable element associated with each node, the adjustable element configured to receive a feedback signal and in response to the feedback signal substantially equalize an amplitude of each vector associated with each node, as disclosed in the present invention, are discussed in *Dolman*. Applicants respectfully submit that the Office Action fails to specifically state the language in *Dolman* that would motivate one having ordinary skill in the art to provide an adjustable element associated with each node, the adjustable element configured to receive a feedback signal and in response to the feedback signal substantially equalize an amplitude of each vector associated with each node, as disclosed in the present invention. Instead, when referring to *Dolman*, the Office Action merely states that

*Dolman* teaches...An adjustable element associated with each node, the adjustable element configured to substantially equalize an amplitude of each vector associated with each node (see col. 9, lines 11-30)

Applicants respectfully submit that there is nothing in *Dolman*, in col. 9, lines 11-30, or elsewhere, that discloses an adjustable element associated with each node, the adjustable element configured to receive a feedback signal and in response to the feedback signal substantially equalize an amplitude of each vector associated with each node. Applicants respectfully submit that “[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.” *In re Fritch, supra*.

Accordingly, Applicants respectfully submit that claims 1, 9 and 18 are allowable for at least the reason that they recite features that are neither disclosed, taught nor suggested by

*Dolman*. Further, Applicants respectfully submit that dependent claims 2-5, which depend directly or indirectly from allowable independent claim 1; dependent claim 10, which depends directly from allowable independent claim 9; and dependent claim 19, which depends directly from allowable independent claim 18, are allowable for at least the reason that they depend from allowable independent claims. *In re Fine*, 837 F.2d 1071, 5 USPQ 2d 1596, 1598 (Fed. Cir. 1998).

### **Rejections Under 35 U.S.C. § 103**

#### **Claims 24-28**

Claims 24-28 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious over U.S. Patent No. 4,485,358 to Andren *et al.* (hereafter *Andren*) in view of *Dolman*. For a claim to be properly rejected under 35 U.S.C. § 103, “[t]he PTO has the burden under section 103 to establish a *prima facie* case of obviousness. It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references.” *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988) (Citations omitted). Further, to establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant’s disclosure. *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Further, “[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.” *In re Fritch*, 972 F.2d 1260, 1266, 23 U.S.P.Q.2d 1780 (Fed Cir. 1992).

Applicants’ independent claim 24, as amended, recites features that are not disclosed by the proposed combination.

Specifically, the proposed combination fails to disclose, teach, or suggest Applicants’ “adjustable element associated with each node, the adjustable element configured to *receive a feedback signal and in response to the feedback signal* substantially equalize an amplitude of each vector associated with each node,” as recited in claim 24.

The Office Action admits that “[a]ndren does not teach the filter arrangement including a plurality of nodes, each node configured to provide an associated vector that is offset in phase

offset in phase from a vector associated with each other node.” The Office Action then relies on *Dolman*, stating that

Dolman teaches the filter arrangement including a plurality of nodes (see col. 12, lines 38-44), each node configured to provide an associated vector that is offset in phase from a vector associated with each other node (see col. 9, lines 31-44);

An adjustable element associated with each node, the adjustable element configured to substantially equalize an amplitude of each vector associated with each node (see col. 9, lines 11-30). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the teachings of Dolman to said device to Andren in order to better reduce unwanted signal interference when operating with a plurality of nodes.

Applicants respectfully submit that *Dolman* fails to remedy the admitted deficiency of *Andren* in that the proposed combination fails to disclose, teach or suggest at least “an adjustable element associated with each node, the adjustable element configured to *receive a feedback signal and in response to the feedback signal* substantially equalize an amplitude of each vector associated with each node,” as recited in claim 24.

Further, Applicants respectfully disagree with the statement in the Office Action that

[t]herefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the teachings of Dolman to said device to Andren in order to better reduce unwanted signal interference when operating with a plurality of nodes.

Applicants respectfully submit that the present invention equalizes an amplitude of a plurality of vectors so that the phase separation of the vectors is substantially 45 degrees, and does not attempt to “reduce unwanted signal interference when operating with a plurality of nodes,” as stated in the Office Action.

Accordingly, claim 24 is allowable over the proposed combination. Further, dependent claims 25-28, which depend either directly or indirectly from claim 24, are also allowable. *In re Fine, supra*. Accordingly, Applicants respectfully request that the rejection of claims 24-28 be withdrawn.

Claims 6-8, 11-17 and 20-23

Claims 6-8, 11-17 and 20-23 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious over *Dolman* in view of U.S. Patent No. 5,912,926 to Koenck *et al.* (hereafter *Koenck*).

Applicants respectfully submit that the proposed combination fails to disclose, teach or suggest all of the features of independent claims 1, 9 and 18. Accordingly, claims 6-8, which depend either directly or indirectly from allowable claim 1; claims 11-17, which depend either directly or indirectly from allowable claim 9; and claims 20-23, which depend either directly or indirectly from allowable claim 18, are allowable for at least the reason that they depend from allowable independent claims. *In re Fine, supra*.

Claims 29-31

Claims 29-31 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious over *Dolman* in view of *Andren* and further in view of *Koenck*.

Applicants respectfully submit that the proposed combination fails to disclose, teach or suggest all of the features of independent claim 24. Accordingly, claims 29-31, which depend either directly or indirectly from allowable claim 24, are allowable for at least the reason that they depend from an allowable independent claim. *In re Fine, supra*.

CONCLUSION

In summary, Applicants respectfully submit that presently pending claims 1-31 are allowable and the present application is in condition for allowance. Accordingly, a Notice of Allowance is respectfully solicited. Should the Examiner have any comments regarding the Applicants' response or intends to dispose of this matter in a manner other than a Notice of Allowance, Applicants request that the Examiner telephone Applicants' undersigned attorney.

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